AMENDMENTS TO THE CLAIMS

1. (Currently Amended) ~~Recrystallized lead~~ Lead or lead alloy ~~formed by recrystallizing a mass of lead or lead alloy to produce~~ having a percentage of special grain boundaries which is at least 20% of the total grain boundaries of said lead or lead alloy; said ~~recrystallization being effected~~ special grain boundaries being formed by subjecting ~~said~~ a mass of said lead or lead alloy to at least one cycle having the sequential steps of:

a) deforming at least a portion of said mass of lead or lead alloy while maintaining said mass at a temperature up to the solvus temperature of said lead or lead alloy, and optionally quenching said mass;

b) annealing said mass of lead or lead alloy at a temperature between 100°C and the melting point of said lead or lead alloy for a time sufficient to ~~effect recrystallization of said lead or lead alloy~~ establish said special grain boundaries; and

c) optionally repeating steps a) and b);

said lead alloy being lead alloyed with at least one element selected from the group consisting of Ag, Al, As, Ba, Bi, Ca, Cd, Cu, Fe, Li, Mg, Na, Se, Sb, Sn, Sr, and Zn.

2. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 1 wherein said mass of lead or lead alloy which is subjected to said at least one cycle is a current collector in the form of a bookmold grid, a tubular grid, a foil, a sheet, a perforated strip, a continuous cast grid, a continuous cast grid rolled to its final dimensions, a connector or a non consumable electrode for use in an electrochemical cell.

3. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 2 wherein said deforming takes place by rolling, expanding, punching, bending or peening said solid mass of lead or lead alloy.

4. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 3 which is in the form of a positive current collector, or a strap, lug or post for use in a lead-acid battery.

5. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 4 wherein said solid mass has a thickness equal to or greater than the desired thickness of said positive current collector, strap, lug or post.

6. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 1 formed by ~~recrystallizing~~ deforming and heat treating said mass of lead or lead alloy to produce a percentage of special grain boundaries which is greater than 50% of the total grain boundaries of said lead or lead alloy.

7. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 1 wherein said deforming takes place within a temperature range which is 15°C up to the solvus temperature of said lead or lead alloy.

8. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 7 wherein said temperature range is 40°C to 95°C.

9. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 3 wherein said current collector in the form of a foil, a sheet, a continuous cast grid, a continuous cast grid rolled to its final dimensions or non consumable electrode for use in an electrochemical cell, is deformed by rolling, bending or peening.

10. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 3 wherein said current collector in the form of a bookmold grid, a tubular grid, a foil, a sheet, a perforated strip, a continuous cast grid, a continuous cast grid rolled to its final dimensions, a connector or a non consumable electrode for ~~us~~ use in an electrochemical ~~cells~~ cell is deformed by peening.

11. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 3 wherein said mass is perforated.

12. (Currently Amended) ~~Recrystallized lead~~ Lead or lead alloy ~~formed by recrystallizing a cast billet of lead or lead alloy to produce~~ having a percentage of special grain boundaries which is at least 40% of the total grain boundaries of said lead or lead alloy; said ~~recrystallization being effected~~ special grain boundaries being formed by subjecting ~~said billet~~ a cast billet of said lead or lead alloy to at least one cycle having the sequential steps of:

a) extruding said billet to a strip of desired thickness while maintaining the strip at a temperature up to the solvus temperature of said lead or lead alloy, optionally quenching the strip;

b) optionally deforming the strip by rolling, expanding, punching, bending or peening to a desired thickness while maintaining the strip at a temperature up to the solvus temperature of said lead or lead alloy, optionally quenching the strip;

c) annealing the lead or lead alloy strip at a temperature between 150°C and the melting point of the alloy for a time sufficient to ~~effect recrystallization of the lead or lead alloy~~ establish said special grain boundaries;

said lead alloy being lead alloyed with at least one element selected from the group consisting of Ag, Sn, Cu, Zn, As, Bi, Li, Na, Al, Mg, Ca, Sr, Ba, Cd, Fe, Se, and Sb.

13. (Withdrawn) A method for reducing intergranular degradation of lead or lead alloy which comprises recrystallizing said lead or lead alloy to produce a percentage of special grain boundaries which is at least 20% of the total grain boundaries of said lead or lead alloy; said recrystallization being effected by subjecting said lead or lead alloy to at least one cycle having the sequential steps of:

a) deforming at least a portion of a mass of said lead or lead alloy while maintaining said mass at a temperature up to the solvus temperature of said lead or lead alloy, optionally quenching said mass;

b) annealing said mass of lead or lead alloy at a temperature between 150°C and the melting point of said alloy for a time sufficient to effect recrystallization of said lead or lead alloy;

c) optionally repeating steps a) and b);

said alloy being lead alloyed with at least one element selected from the group consisting of Ag, Al, As, Ba, Bi, Ca, Cd, Cu, Fe, Li, Mg, Na, Se, Sb, Sn, Sr, and Zn.

14. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 1 wherein said annealing takes place at a temperature between 150°C and the melting point of said lead or lead alloy.

15. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 7 wherein said deformation takes place at a temperature which is more than 15°C up to the solvus temperature of said lead or lead alloy.

16. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 15 wherein said deformation takes place at a temperature which is in the range of 40°C up to the solvus temperature of said lead or lead alloy.

17. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 15 wherein said deformation is carried out at a temperature which is in the range of 30°C to 125°C.

18. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 15 wherein said deformation takes place at a temperature within the range of 35°C to 200°C.

19. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 15 wherein said deformation takes place at a temperature within the range of 40°C to 150°C.

20. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 15 wherein said deformation takes place at a temperature which is within the range of 60°C to 125°C.

21. (Currently Amended) The ~~recrystallized~~ lead alloy of claim 1 wherein said lead alloy is deformed by about 1%-99% in step a) and said lead alloy is annealed in step b) within the temperature range of 100°C-325°C for one second to 360 minutes.

22. (Currently Amended) The ~~recrystallized~~ lead alloy of claim 21 wherein said lead alloy is annealed in step b) for 5 seconds-360 minutes.

23. (Previously presented) The lead of claim 1 which is substantially pure lead wherein said lead is deformed in the range of 1% to 70% in step a) and said lead is annealed in step b) within the temperature range of 150°C- 325°C for 5 seconds to 360 minutes, whereby said lead has a percentage of special

grain boundaries which is greater than 50% of the total grain boundaries of said lead.

24. (Currently Amended) ~~Recrystallized lead~~ Lead alloy ~~formed by recrystallizing a mass of lead alloy to produce~~ having a percentage of special grain boundaries which is greater than 50% of the total grain boundaries of said lead alloy; said ~~recrystallization being effected~~ special grain boundaries being formed by subjecting ~~said~~ a mass of said lead alloy to a single cycle of deformation between 10% and 40% while maintaining said mass at a temperature up to the solvus temperature of said lead alloy followed by ~~recrystallization of said lead alloy~~ by annealing said lead alloy at a temperature between 200°C and 280°C for a time which is in the range of 10 seconds to 10 minutes followed by cooling to ambient temperature;

said alloy being a Pb-X-Y alloy wherein X is ~~a~~ at least one metal selected from the group consisting of Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba and Sb and Y is ~~a~~ at least one metal selected from the group consisting of Ag, Sn, Cu, Zn, As and Bi;

with the proviso that the cumulative concentration of X is less than 0.05 wt. % and the cumulative concentration of Y is in the range of 0.5 to 5 wt. %.

25. (Currently Amended) ~~Recrystallized lead~~ Lead alloy ~~formed by recrystallizing a mass of lead alloy to produce~~ having a percentage of special grain boundaries which is greater than 50% of the total grain boundaries of said lead alloy; said ~~recrystallization being effected~~ special grain boundaries being formed by subjecting ~~said~~ a mass of ~~said~~ lead alloy to at least two cycles having the sequential steps of:

a) deforming at least a portion of said mass of lead alloy to produce a deformation between 40%-80% while maintaining said mass at a temperature up to the solvus temperature of said lead alloy;

b) annealing said mass of lead alloy at a temperature between 200°C and 280°C for a time which is in the range of 10 seconds to 10 minutes to ~~effect recrystallization of said lead alloy~~ establish said special grain boundaries;

and then, after completing said at least 2 cycles, cooling said lead alloy to ambient temperature;

said lead alloy being a Pb-X-Y alloy wherein X is ~~a~~ at least one metal selected from the group consisting of Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba and Sb and Y is ~~a~~ at least one metal selected from the group consisting of Ag, Sn, Cu, Zn, As and Bi;

with the proviso that the cumulative concentration of X is greater than or equal to 0.05 wt. % and the cumulative concentration of Y is in the range of 0.5 to 5 wt. %.

26. (Previously presented) The lead of claim 1 which is substantially pure lead wherein said lead is in the form of a cast strip;

said strip is deformed in step a) by rolling said strip in a rolling mill at room temperature to produce a 20% reduction in thickness;

said lead is annealed in step b) at a temperature of 160°C for 15 minutes;

and said strip is subjected to 6 of the cycles.

27. (Currently Amended) The ~~recrystallized~~ lead alloy of claim 1 which consists of 0.073 wt. % Ca, 0.7 wt.% Sn with the balance being Pb;

said mass is in the form of a strip;

said strip is deformed in step a) by cold rolling at room temperature to achieve a 40% reduction in thickness;

said lead alloy is annealed in step b) at a temperature of 270°C for 10 minutes;

the number of cycles is 3;

and said lead alloy is cooled to ambient temperature after completing said three cycles.

28. (Currently Amended) The ~~recrystallized~~ lead alloy of claim 1 which consists of 0.065 wt. % Ca, 0.7 wt.% Sn and 0.03 wt. % Ag with the balance being Pb;

said mass is in the form of a strip;

said strip is deformed in step a) by cold rolling at room temperature to achieve a 40% reduction in thickness;

said lead alloy is annealed in step b) at 250°C for 10 minutes;

the number of cycles is 2;

and said lead alloy is cooled to ambient temperature after completing said two cycles.

29. (Currently Amended) The ~~recrystallized~~ lead alloy of claim 1 which consists of 0.073 wt. % Ca, 1.4 wt. % Sn with the balance being Pb;

said mass is in the form of a strip;

said strip is deformed in step a) by cold rolling at room temperature to achieve a 40% reduction in thickness;

said lead alloy is annealed in step b) at 250°C for 10 minutes;

the number of cycles is 2;

and said lead alloy is cooled to ambient temperature after completing said two cycles.

30. (Currently Amended) A ~~recrystallized~~ lead alloy which consists of 0.03 wt. % Ca, 0.7 wt. % Sn, 0.06 wt. % Ag, with the balance being Pb produced by casting a strip of said alloy having a thickness of 0.86-0.89 mm; subjecting said strip to a single processing cycle comprised of about 20% cold tensile strain at room temperature; and heat treatment at a temperature of 250°C for 5 minutes followed by cooling to ambient temperature.

31. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 12 wherein said strip is deformed in step b).

32. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 31 which is in the form of a positive current collector for use in a lead-acid battery.

33. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 32 wherein said strip has a thickness equal to or greater than the desired thickness of said positive current collector.

34. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 31 ~~formed by recrystallizing said lead or lead alloy to produce~~ having a percentage of special grain boundaries which is greater than 50% of the total grain boundaries of said lead or lead alloy.

35. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 31 wherein said steps a) and/or b) take place within a temperature range which is 15°C up to the solvus temperature of said lead or lead alloy.

36. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 35 wherein said temperature range is 40°C to 95°C.

37. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 31 wherein said strip is deformed in step b) by rolling, bending or peening.

38. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 37 wherein said strip is deformed in step b) by peening.

39. (Currently Amended) The ~~recrystallized~~ lead or lead alloy of claim 31 wherein said strip is perforated.